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DELAWARE ESTUARY COMPREHENSIVE STUDY
PROGRAM REVIEW

Public Health Service
New York, New York

January 1964

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Delaware Estuary Comprehensive Study

REPORT NUMBER _____

PROGRAM REVIEW
January 1964



U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service
Division of Water Supply and Pollution Control

NATIONAL REGIONAL
INFORMATION SERVICE

Delaware Estuary Comprehensive Study

Report Number _____

PROGRAM REVIEW
January 1964

Division of Water Supply and Pollution Control
Region II , New York, New York

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service

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COMMUNICATION

1.

Project Headquarters:

U. S. Public Health Service
Delaware Estuary Comprehensive Study
321 Chestnut Street
Philadelphia 6, Pa. 19106

Telephone No.:

Market 7-6000
Extensions 795, 796, 797
FTS - 215-627-6000
Extensions 795, 796, 797

Project Director: Everett L. MacLeman
Technical Director: Robert V. Thomann

Field Laboratory:

Raritan Bay Project
Raritan Arsenal
U. S. Public Health Service Lab
Building #231
Metuchen, New Jersey

Telephone No.:

Liberty 8-3347
Extensions 28, 39
FTS - 212-363-4029
Extensions 28, 39

Chemist in Charge of DECS Activities: Mr. Billy De Prater

PROJECT DESCRIPTION

2.

The long-range goals and objectives of the projects have been described in the following references:

- 1) DECS - Program Review, January 1963
- 2) DECS - Budget Planning, FY 1966 and Six Year Budget Projection (FY 1964 - FY 1969), transmitted to Chief, Technical Services Branch on 11/13/63

There have been no essential changes from the description of long-range goals and objectives given in these documents. Figure 1 is a map of the project area.

CONSULTANTS AND COMMITTEES

Consultants:

- 1) Dr. D. J. O'Connor - Associate Professor of Civil Engineering, Manhattan College, N. Y. Dr. O'Connor has assisted the project in the engineering evaluation of dye studies, both in the model and in the prototype. In addition, it is intended to utilize his services to prepare some preliminary cost estimates on treatment of stormwater overflows as well as the efficacy and cost of in-stream aeration devices.
- 2) Mr. E. Mehr, Research Scientist, Data Processing and Computation Laboratory, New York University. Mr. Mehr has consulted with the project on the preparation of computer programs for the solution of numerical problems including time series analyses, transfer function generation and linear programming applications. Mr. Mehr also acts as liaison between the DECS and Computation Laboratory in the carrying out of responsibilities under an NYU computing contract.

Committees:

A copy of a recently prepared description of the formal arrangements made for coordination and cooperation with various committees and interest groups is enclosed as Attachment 1.

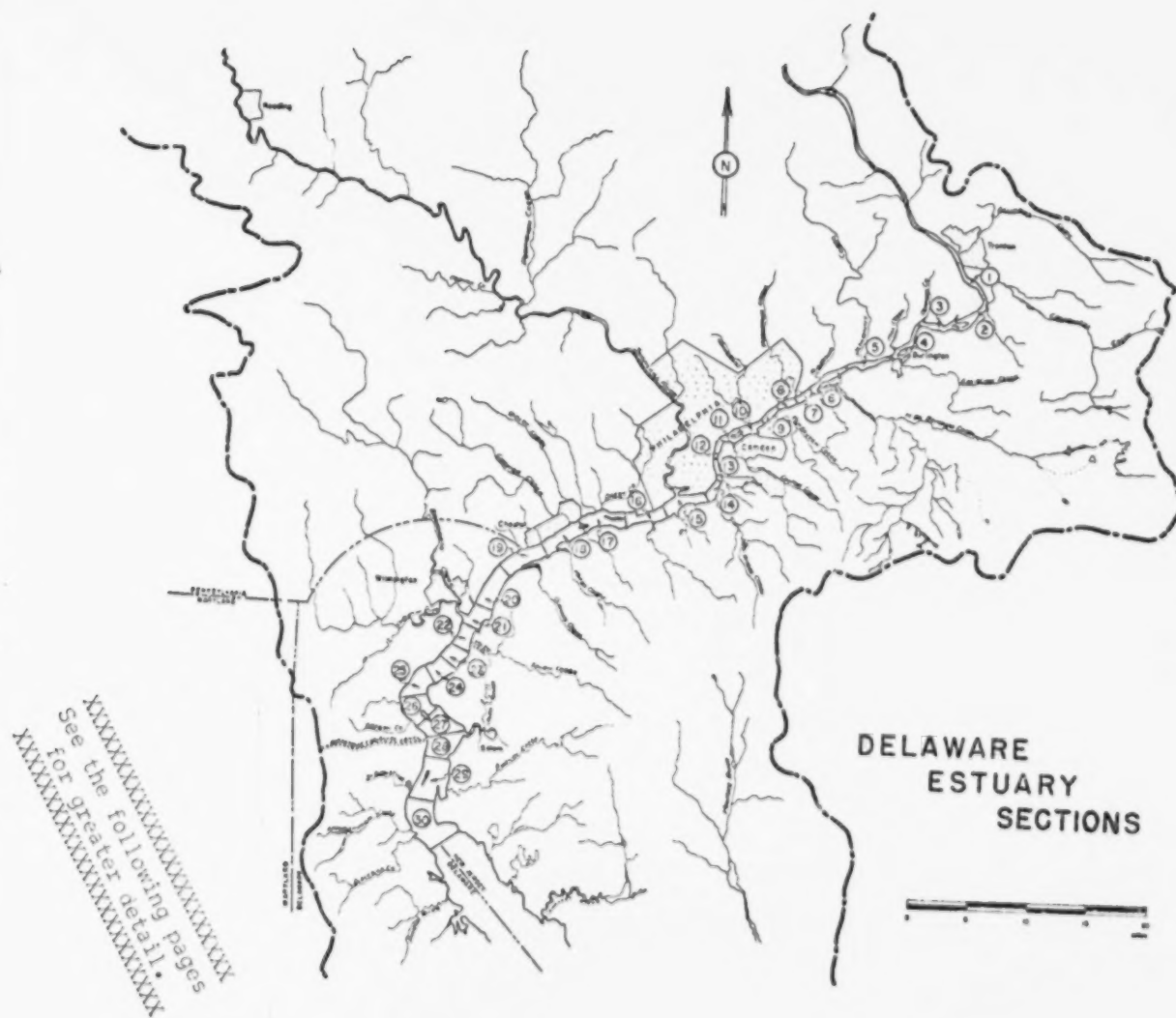


FIGURE 1

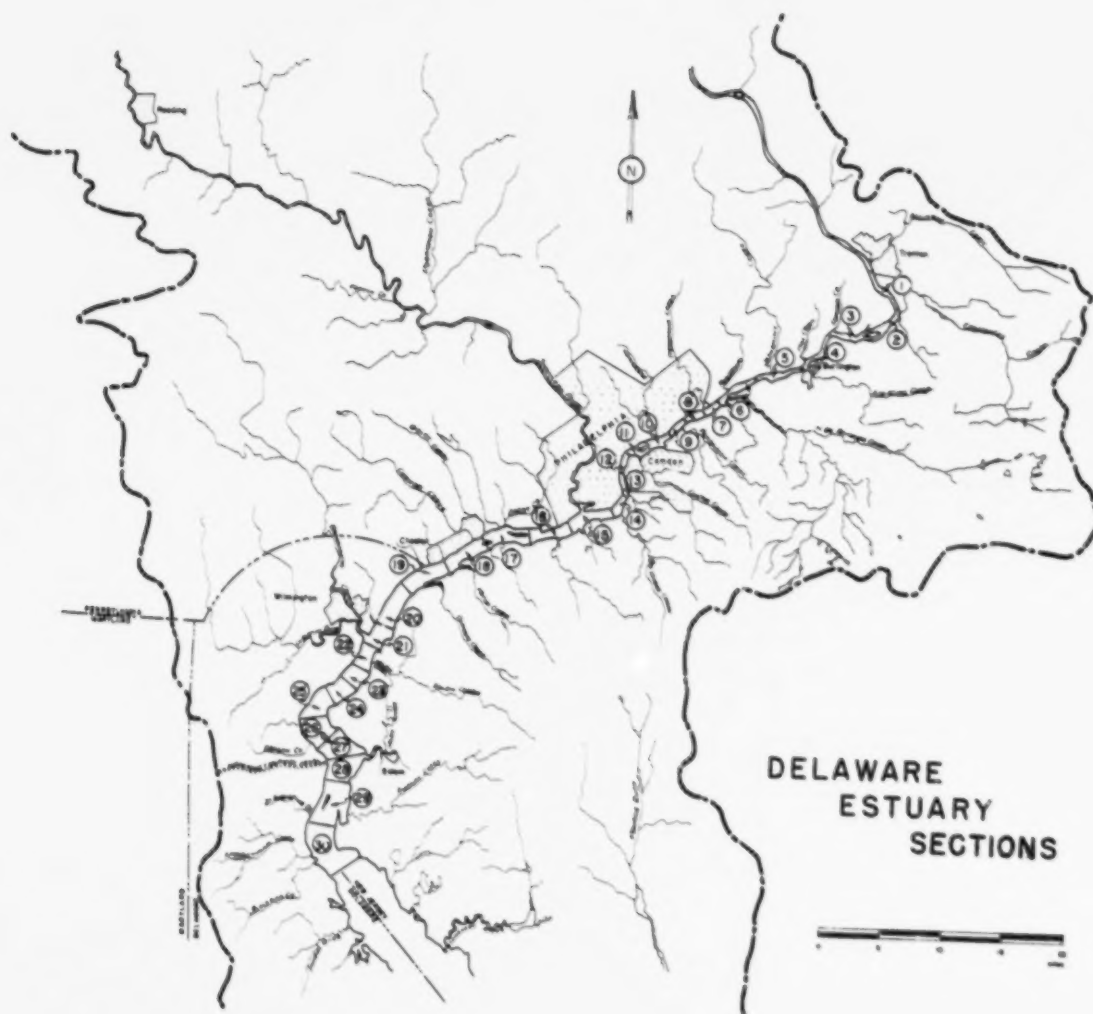


FIGURE 1

4.

ACTIVITIES AND ACCOMPLISHMENTS FY 1964

Description of Major Activities:

During FY 1964, the following continuing program elements are to be emphasized:

- 1) Mathematical models - cause and effect relationships between waste disposal and resulting water quality. The existing one dimensional model will be expanded in some degree to two dimensional model.
- 2) Linear programming problems - generation of optimum (least cost) solutions for specific water quality goals. Examination will be made of how sensitive the solutions are to various constraints, physical environment and degree of accuracy of cost data.
- 3) Biological studies - primarily measurement of photosynthetic oxygen production throughout length of estuary. 50% complete by 7/64.
- 4) Tidal current study - measurement of currents in estuary for purposes of estimating flushing times. Data have not yet been collected from the one meter in place since July 1963. Three additional meters will be placed during spring of 1964. 20% complete by 7/64.
- 5) Stormwater overflow study - measurement of amount and quality of stormwater overflow together with rainfall measurements in the drainage area served by a given outfall. Some data collected by the existing installation. Receipt of second installation is expected in January, 1964. All known outfalls in Philadelphia have been plotted. Contract has been let for three additional sets of equipment scheduled for installation in spring of 1964. Rain gages will be placed at this time. 20% complete by 7/64.
- 6) Industrial waste study - sampling of wastes from 23 significant industries. All industries in this group will have been contacted by February, 1964 with sampling programs underway at all 23 industries by March, 1964. Sampling at each installation to continue for about one year. 60% complete by 7/64.

The following program elements were started or will be started during FY 1964:

- 1) Economic studies - projections of future waste loads and resulting water quality using data from several sources, including The Economic Base Survey of Corps of Engineers Report and the data collected by Penn-Jersey Transportation Study.

- 2) Dynamic investment problem - investigation of water quality control alternatives available under a time dependent environment. The degree of emphasis on this element depends on results of water quality projections.
- 3) Tributary sampling program - routine sampling of major tributaries to continue for about one year. 90% complete by 7/64.
- 4) Estuary sampling program (South section) - routine sampling of southern portion of estuary to be begun during February, 1964. This includes portion from Marcus Hook, Pa. south to the lower end of the estuary. 40% complete by 7/64.

The following program element was completed during FY 1964:

- 1) Estuary sampling program (North section) - routine sampling of the water quality of the estuary from Marcus Hook, Pa. north to Trenton, N.J. will be discontinued during 2/64.

Contracts:

- 1) A contract with the Re-Entry Systems Department of the General Electric Company is being negotiated. This contract is for the evaluation of alternative means of computation including use of digital, analog or hybrid computers.
- 2) A computer contract with New York University was let during the last quarter of FY 1963. As of January, 1964, about 50% of this contract had been utilized. Due to relatively efficient programming of the problems, it will not be necessary to renew this contract until early FY 1965.
- 3) A service contract for approximately 500 hours of launch service was let during December, 1963.
- 4) A contract with the Bureau of Outdoor Recreation will be undertaken during the latter half of FY 1964. This contract will continue to FY 1966.

Data Storage and Retrieval Activities:

At a recent meeting with members of the Delaware River Basin Commission a starting point for a river mileage system was established. A meeting is scheduled for early February to discuss the possibility of the Commission's adopting the Service's program and assisting in the preparations of the maps. Size and number of maps needed will be determined at this meeting.

Flow Regulation Studies:

A draft on the Beltzville Dam and Reservoir project is scheduled for submission to Headquarters review during February, 1964. About six man-months of project effort were devoted to this study.

Continual observations are made of the effects of flow regulation at Trenton on the estuarine water quality. No unusual effects on quality were noted as a result of the cessation of New York City's diversions out of the Basin.

Bibliography:

- Technical Report No. 1 - Report on Analysis of the Dye Diffusion Data in the Delaware River Estuary - Evaluation of Diffusion Coefficients
- Technical Report No. 2 - Estuarine Water Quality - Management and Forecasting
- Technical Report No. 3 - Minimizing Costs of Investments to Improve Water Quality: An Illustrative Problem
- Technical Report No. 4 - Mathematical Model for Dissolved Oxygen
- Technical Report No. 5 - On the Management of the Quality of Natural Water Systems
- Special Interim Report - Review of Present Water Quality and Interstate Standards of the Delaware Estuary Interim Report from the Technical Committee to the Policy Advisory Committee - September, 1963

All of the Technical Reports indicated above are being duplicated and copies will be forwarded to Headquarters during January, 1964. Copies of the Interim Report have already been made available to Headquarters as well as members of the Policy Advisory and Technical Advisory Committees.

Accomplishments through June 30, 1964:

In order to provide an effective mechanism for the flow of technical information to those responsible for the implementation of a water quality management program, the DECS in July, 1963 established a Policy Advisory Committee. This Committee brings together those agencies (State, Interstate and Federal) that have the authority to abate water pollution. This has been the main forum for interagency coordination and cooperation and as indicated below has proved particularly effective.

In addition to the Policy Advisory Committee, a start has been made on a Water Use Advisory Committee which will bring together representatives from the many diverse water users. A preliminary explanation of the

functions of this Committee was given to a representative group of water users and a more formal organizing meeting of the industrial sub-committee is scheduled for the spring of 1964.

Attachment 1 provides additional information on these committees.

One of the more noteworthy accomplishments of the project has been the ability to indicate to the members of the Policy Advisory Committee and others, the possible outcomes of a variety of decisions affecting water quality. This ability took the form of an Interim Report to the Committee that provided information on three more immediate questions:

- 1) What is the effectiveness of the present interstate effluent and water quality standards? That is, if all known sources were to adhere to the requirements of the standards, what would be the quality response on the Estuary?
- 2) What optimum (least cost) control program should be undertaken to produce at least a summer average of 4 mg/l DO everywhere in the Estuary?
- 3) What optimum control program would yield a summer average of at least 2 mg/l DO everywhere in the Estuary?

The full Report was available to the Committee during November, 1963 only one and a half years after the actual beginning of the Study. The results given in the Report stimulated a healthy and vigorous dialogue amongst the members of the Policy Advisory Committee. The Committee which has representation from all the state and interstate water pollution control regulating agencies were thus able to evaluate the effects of alternative program decisions on water quality relatively early after the start of the Study.

Departure from 1964 Plans:

Delay in the delivery of equipment has necessitated extension of the stormwater overflow study to January, 1966.

Budgetary difficulties have 1) delayed the initiation of data storage and retrieval activities (STORET), 2) forced cancellation of FY 1964 dye studies, 3) restricted further investigation of analog computation, and 4) resulted in a reduction in the number of tidal current meters to be purchased.

The industrial waste sampling program has been extended to about March 1965 due to inclusion in the program of about twelve additional industries.

The start of the economic studies was delayed due to difficulties in securing the necessary personnel.

PLANS AND SCHEDULES FY 1965Description of Major Activities:

The following continuing program elements will be emphasized in FY 1965:

- 1) Economic studies - Estimates will continue to be made of future waste loads and effects thereof on water quality. 70% complete by 7/65.
- 2) Optimum control programs - Emphasis will be placed on utilizing Industrial Water Use sub-committees to develop cost of treatment data for each industry. 70% complete by 7/65.
- 3) Mathematical models - Investigation will continue to be made into interactions between cause and effect relationships and optimum control programs. Additional emphasis will be placed on application of models to other quality parameters. 80% complete by 7/65.
- 4) Biological studies - Investigations will be made of bottom organisms and periphyton for future estimating purposes of the effects of Comprehensive Plan on the biota of the stream. Measurement of photosynthetic production of DO will be completed during FY 1965. Overall biological studies - 90% complete by 7/65.
- 5) Tidal current study - Four meters will have been placed and extensive data analyses will begin during second half of FY 1965 - 80% complete by 7/65.
- 6) Stormwater overflow study - Five instrumented stations will have been placed and analysis of data as it is generated will continue. 80% complete by 7/65.
- 7) Recreation study - The BOR will continue investigation of the future recreational needs of the estuary area and the impact of increased water quality on recreational activities - 60% complete by 7/65.

The following program elements will be started during FY 1965:

- 1) Dye studies - Investigations will be carried out to determine diffusion in tidal flat areas and back channels for input data for two dimensional model - 90% complete by 7/65.
- 2) Fisheries resource studies - A small contract with the Fish & Wildlife Service will investigate the anticipated benefits on the fisheries resource of improved quality - 100% complete by 7/65.

The following program elements will be completed during FY 1965:

- 1) Estuary Sampling (South section) - Routine sampling of southern stretch of estuary will be discontinued during 2/65.
- 2) Tributary sampling - Field investigations of quality of tributaries will be discontinued during 8/64.
- 3) Industrial waste sampling - One year of effluent analyses from all of the 23 significant industries will have been obtained during FY 1965.

Flow Regulation Studies:

Some negotiations with the Corps of Engineers will probably be necessary relative to the study of the Tocks Island Dam & Reservoir. The effects of flow regulation on the quality of the estuary will be incorporated into the Delaware Estuary Comprehensive Study.

Bibliography:

It is expected that the following reports will be prepared or available during FY 1965:

- 1) Waste Load and Water Quality Projections
- 2) Photosynthetic production in Delaware Estuary
- 3) Time series analyses of water quality in Delaware Estuary
- 4) Industrial waste load in the Delaware Estuary

Major Accomplishments:

It is anticipated that by about January, 1965, a first preliminary analysis of a Comprehensive Plan will be available. This report will present in as much detail as is possible at the time the technological steps that are necessary for the attainment of increased water quality.

PLANS FY 1966

Figure 2 indicates the projected status of the Delaware Estuary Comprehensive Study during FY 1966. As indicated therein, the following programs will be completed during that year.

- 1) River sampling
- 2) Stormwater overflow study
- 3) Tidal current investigation
- 4) Dye studies
- 5) Biological work including measurement of photosynthetic production of oxygen
- 6) Economic study

In addition, the anticipated contract work by the Bureau of Outdoor Recreation should be completed during this time. The contracts shown in Figure 2 with the Corps of Engineers and Department of Agriculture will be for review of the drafts of the Comprehensive Plan.

The content then of the 1966 program consists of two parts:

- 1) Completion of studies, primarily field investigations, that were started in earlier years.
- 2) Initiation of the formal compilation of the comprehensive water quality management plan.

It is anticipated that by the end of FY 1966, the committee structure established during FY 1964 will have produced a coalition of thinking on the balance between a willingness to expend funds and desired water uses. By 1966 several different least cost solutions to varying levels of water quality will have been discussed, absorbed and decided upon. The effects of the Project will then be devoted to the effective presentation and promulgation of the Comprehensive Plan.

ORGANIZATION AND MANAGEMENT
OF
DELAWARE ESTUARY COMPREHENSIVE STUDY

PROJECT SCHEDULE AND ORGANIZATIONAL
CHARTS

Figure 2 presents the time schedule of the major activities of the DECS and Figures 3 and 4 delineate the organization of the project, effective January 1, 1964.

FUNCTIONAL STATEMENT

Introduction:

The Delaware Estuary Comprehensive Study is concerned with developing a comprehensive program for the management of the water quality of the Estuary. The project will provide a set of techniques that will afford the opportunity to describe the variation of quality in the future, make rational and technically well-founded decisions on alternatives to control the quality and finally to accomplish these aims within a given economic environment. The project as of FY 1964 has a staff of 18 people and is budgeted through 1967 at about \$1,000,000.

Plans and Projections Unit:

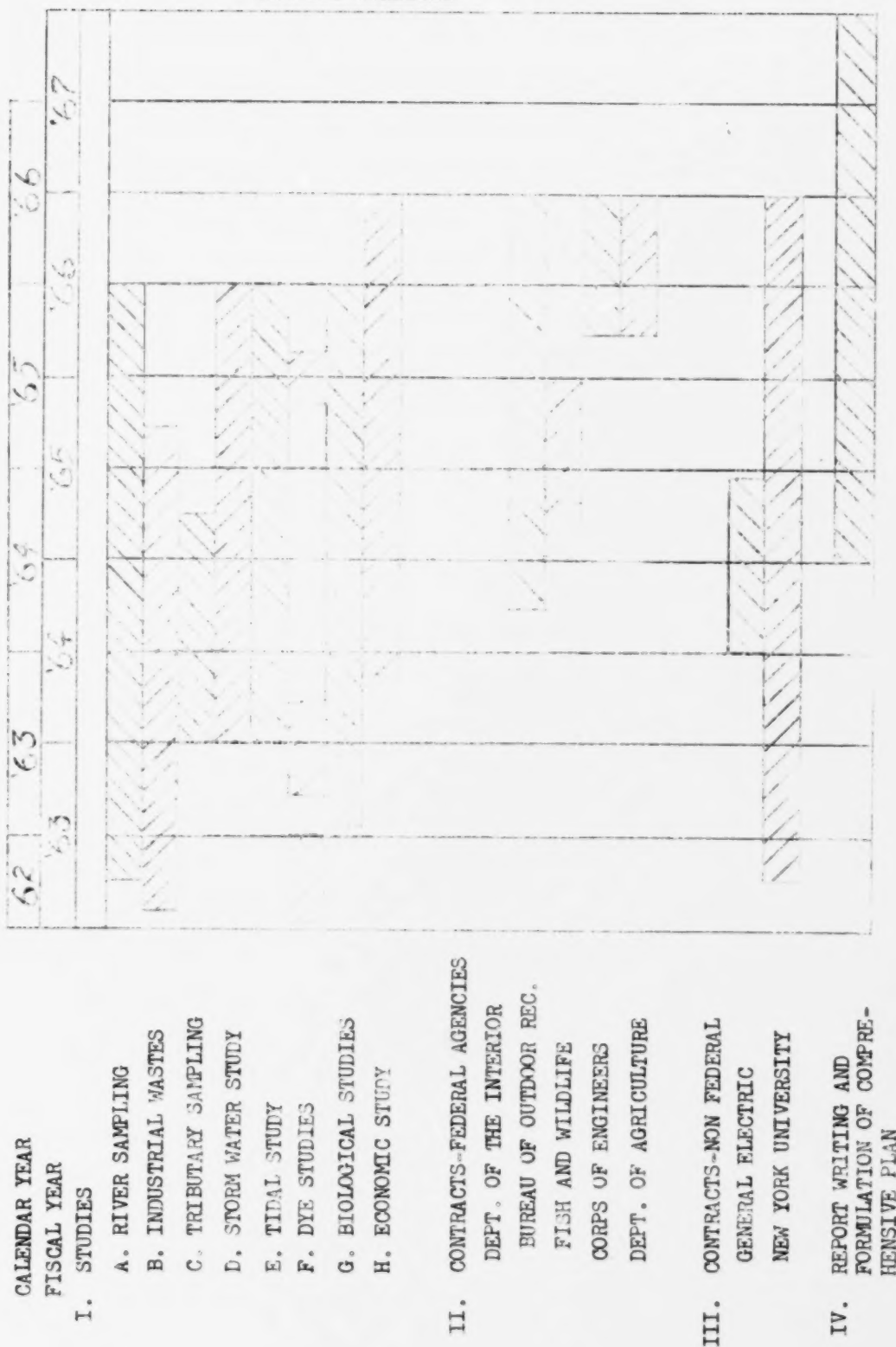
This unit is responsible for data analysis and the application of operations research to water quality management. Data analysis includes the statistical design and analysis of experiments, the analysis of water quality data, and the computerization of these activities. Operations research includes evaluations of alternative programs to attain improved water quality and economic analysis of the benefits and minimum costs associated with these programs.

Operations Unit:

This unit is responsible for obtaining all field data concerned with water quality. This includes data on the quality of the Estuary and its tributaries, data on the wastes entering the Estuary (e.g. industrial and municipal wastes and stormwater overflow discharges) and data on the interrelationships between the biology of the streams and water quality.

FIGURE 2
PROJECT SCHEDULE

DELAWARE ESTUARY COMPREHENSIVE STUDY
U.S.P.H.S. - DEPT. OF H.E.W.
TIME SCHEDULES FOR INDIVIDUAL STUDIES AND CONTRACTS



Region II
Comprehensive Project
Delaware River Basin
DWS&P

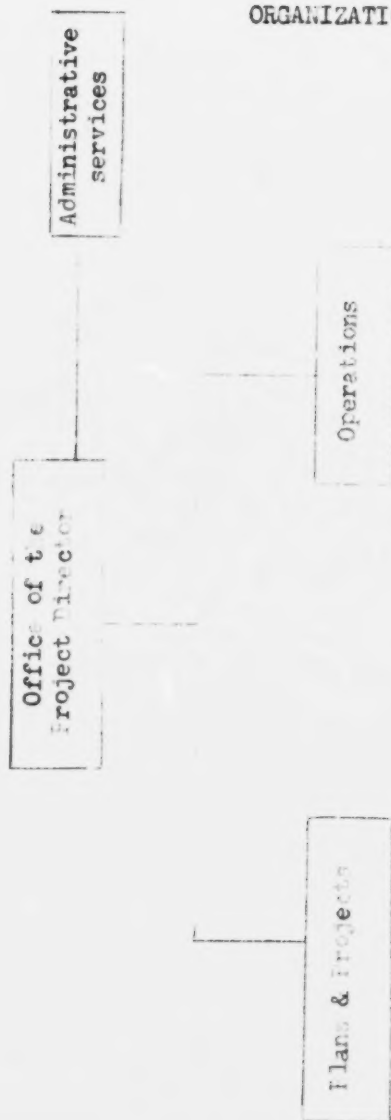


FIGURE 3
ORGANIZATION CHART

13.

Effective 1/1/64

Region II
DELAWARE ESTUARY COMPREHENSIVE STUDY
DWS&FC



FIGURE 4
ORGANIZATION CHART
WITH PERSONNEL

Temporary Staff

1- Laboratory Technician Half time at Raritan Lab Grossmueller, W.

Summer 1964

1- Engineer Wallach, K GS-4
2- Laboratory Technician Sellar, T. COSTEP

* Drexel Institute of Technology Co-op Student assigned to office for 6 months
expected starting date - 1/5/64.

14.
1/1/64

FIGURE 5
PERSONNEL ROSTER

January 1, 1964

DIVISION OF WATER SUPPLY AND POLLUTION CONTROL
TECHNICAL SERVICES BRANCH
DELAWARE ESTUARY COMPREHENSIVE STUDY

15.

Title	Grade	Series	Pos. No.	Name	Duty Station
<u>Off of the Project Director</u>					
1- Project Director	SEDIR	-	-	MacLeman, E.L.	Phila., Pa.
2- Deputy-Technical	SE	-	-	Thomann, R.V.	" "
3- Clerk-Stenographer	GS-4	312	II-282	Lipman, R.	" "
<u>Administrative Services</u>					
4- Administrative Clerk	GS-5*	-	-	Tobin, V.	" "
<u>Plans and Projects</u>					
5- Ch Planning Engineer	SASE	-	-	Sobel, M.	" "
6- Evaluation Engineer	SASE	-	-	Marks, D.	" "
7- Eng.-CofE & SCS Proj.	SASE	-	-	Baker, D.	" "
8- Sanitary Engineer	ASE	-	-	Pence, G.	" "
<u>Operations</u>					
9- San. Engr.-Ind. Waste	SASE	-	-	Bromberg, A.	" "
10- San. Engr.-Stormwater Overflow	SASE	-	-	Stoltenberg, D.	" "
11- San. Engr. - Stream Sampling Program	SASE	-	-	Wright, D.	" "
12- Sanitary Engineer	SASE	-	-	Blackard, W.	" "
13- Sanitary Engineer	ASE	-	-	Richardson, W.	" "
14- Biologist	GS-11	401	6170	Morris, A.R.	" "
15- Chemist, Analytical	GS-9	1320	5501	DePrater, Bill L.	Raritan Lab Metuchen, N.J.
16- Chemist	AHSO	-	-	Knight, R.	Phila., Pa.
17- Lab. Technician **	GS-4	404	287	Toomey, T.	" "
18- Lab. Technician **	GS-4	404	287	Dow, D.	" "
<u>Temporary Staff</u>					
1- Physical Science Aid 1/	GS-3	1311	II-286	Grossmueller, W.	Raritan Lab Metuchen, N.J.
<u>Summer 1964 (Planned)</u>					
2- Engineer	GS-4	802	II-291	Wallech, K.	Phila., Pa.
3- Lab. Technician	COSTEP	-	-	Sellar, T.	" "

* Assigned to temporary position of GS-4, 332, II-314, Clerk-Typist, while GS-5 Administrative Clerk job description is being prepared.

** Drexel Institute of Technology Cooperative Students assigned to office for six months, expected starting date 1/5/64.

1/ Half time employee (20 hrs/wk)

Inter-Unit Support:

The extent of support between the Plans and Projections Unit and the Operations Unit includes:

- 1) Data generated in Operations Unit is transmitted directly to Plans and Projections Unit for inclusion in the various mathematical analyses.
- 2) Several different types of sensitivity analyses performed in the Plans and Projections Unit are used to guide the direction of further data collection in the Operations Unit. In some cases the results of these analyses have indicated to the Operations Unit that data need no longer be collected in a particular area.

PERSONNEL ROSTER

Figure 5 presents the details of the roster.

PERSONNEL NEEDS

As indicated on the Personnel Roster, under present interpretation of personnel ceilings, no vacancies exist. The Study at the present time is thus fully staffed. However, as noted in the Roster, two additional positions are planned for the summer of 1964. These temporary summer positions represent the only personnel needs the project is experiencing. The Roster also indicates a part-time position at the Haritan Arsenal. If part-time and temporary positions are to be included under personnel ceilings, authorization will have to be requested for an additional position. Figure 6 summarizes the personnel needs of the Study for the summer of 1964.

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FIGURE 6

PERSONNEL NEEDS - SUMMER 1964

Project: Delaware Estuary Comprehensive Study

<u>Title</u>	<u>Grade</u>	<u>Series</u>	<u>Job Desc. Status</u>		<u>Position</u>		<u>Duty Station</u>	<u>EOD</u>
			<u>Pre.</u>	<u>App.</u>	<u>Class.</u>	<u>Auth.</u>	<u>Funded</u>	
Engineer	GS-4	802	Yes	Yes	Yes	*	Yes	Phila., Pa. 6/64
Lab. Technician	COSTEP					*	Yes	" " "

* Authorization of positions must await determination of BSS summer ceiling.

WORKING BUDGET
Request for Funds, Fiscal Year 1965

Region and Location <u>II - Phila., Pa.</u>		Program/Project No. Comprehensive/642 and Title <u>Delaware Estuary Study</u>	
1964 Allotment No. _____	1964 ^{1/} Actual	1965 Request	Increase or Decrease
1. Request			
11 Personnel Compensation (Total)	<u>90 00</u>	<u>100,000</u>	<u>+10,000</u>
Compensation other than con- sultants	<u>0</u>	<u>0</u>	<u>0</u>
Consultants' fees	<u>1,500</u>	<u>800</u>	<u>-700</u>
12 Personnel benefits	<u>27,000</u>	<u>30,700</u>	<u>+3,700</u>
21 Travel			
Change of station including dependents and dislocation allowance	<u>0</u>	<u>0</u>	<u>0</u>
Car rental (all sources)	<u>3,600</u>	<u>4,600</u>	<u>+1,000</u>
Other	<u>3,000</u>	<u>4,500</u>	<u>+1,500</u>
22 Transportation of things			
Change of station	<u>800</u>	<u>1,000</u>	<u>+200</u>
Other	<u>0</u>	<u>0</u>	<u>0</u>
23 Rents, communications & utilities (Do not include space rental)	<u>1,600</u>	<u>2,000</u>	<u>+400</u>
24 Printing and reproduction	<u>600</u>	<u>2,000</u>	<u>+1,400</u>
25 Other services			
Contracts (Itemize)	<u>36,400</u>	<u>45,500</u>	<u>+9,100</u>
General Electric	24,500	Fish & Wildlife	2,500
Bu. of Outdoor Rec.	5,500	Bu. of Outdoor Rec.	24,000
Haeber Launch Ser.	6,400	Computer	10,000
	<u>26,400</u>	Launch	5,000
		Data Proc.	4,000
			<u>45,500</u>
Other	<u>1,500</u>	<u>0</u>	<u>-1,500</u>

1/ Include pay raise effective 1/5/64

WORKING BUDGET
Request for Funds, Fiscal Year 1965 - Cont'd.

Region and Location II - Phila., Pa.

Program/Project No. Comprehensive/642
and Title Delaware Estuary Study

1963 Allotment No.	1964 Actual	1965 Request	Increase or Decrease
26 Supplies and materials	<u>10,000</u>	<u>3,000</u>	<u>-7,000</u>
31 Equipment (Itemize and justify. Use separate sheet if necessary)	<u>40,400</u>	<u>7,900</u>	<u>-32,500</u>
3 Tidal Current Meters	6,600		
5 Stormwater Meters	14,500	Dye Studies	5,000
7 Rain Gages	1,200	Misc. Equip.	2,900
2 Data loggers	9,700		<u>7,900</u>
Plankton	3,500		
Misc. Equip.	<u>4,200</u>		
	<u>40,400</u>		
Total	<u>216,400</u>	<u>202,000</u>	<u>-14,400</u>

WORKING BUDGET
Request for Funds, Fiscal Year 1964 - Cont'd.

Region and Location II - Phila., Pa. Program/Project No. Comprehensive/642
and Title Delaware Estuary Study

1964 Allotment No. _____

2. Requested Apportionment

	<u>1st</u> <u>Qtr.</u>	<u>2nd</u> <u>Qtr.</u>	<u>3rd</u> <u>Qtr.</u>	<u>4th</u> <u>Qtr.</u>	<u>Total</u>
Personnel compensation & Benefits	27,500	28,000	30,500	32,500	118,500
Travel	1,000	1,800	1,800	2,000	6,600
Contracts	2,600	3,800	24,500	5,500	36,400
Other	<u>8,000</u>	<u>36,100</u>	<u>5,800</u>	<u>5,000</u>	<u>54,900</u>
Total	39,100	69,700	62,600	45,000	216,400

Justification for Unequal Apportionment

Personnel compensation & benefits:

Increase by quarters due to pay increases
and time schedule for consultants.

Travel:

Increase in last 3 quarters due to additional
personnel travel requirements and added vehicles.

Contracts:

Launch contract split between 1st and 2nd Quarter.
General Electric contract awarded in 3rd Quarter.
Bureau of Outdoor Recreation, Card Punching and
data retrieval contracts schedule for 4th Quarter.

Other: Laboratory equipment purchases (3 Tidal Current
Meters \$6,600, 4 Stormwater Gages \$13,100, 7 Rain
Gages \$1,900 and 2 Data Loggers \$9,700) in 2nd
Quarter are main causes for unequal apportionment.

WORKING BUDGET
Request for Funds, Fiscal Year 1965 - Cont'd.

Region and Location II - Phila., Pa.

Program/Project No. Comprehensive/642
and Title Delaware Estuary Study

2. Requested Apportionment

	<u>1st</u> <u>Qtr.</u>	<u>2nd</u> <u>Qtr.</u>	<u>3rd</u> <u>Qtr.</u>	<u>4th</u> <u>Qtr.</u>	<u>Total</u>
Personnel compensation & Benefits	33,500	32,500	33,000	32,500	131,500
Travel	2,300	2,300	2,300	2,200	9,100
Contracts	38,500	7,000	-	-	45,500
Other	<u>3,600</u>	<u>2,700</u>	<u>2,200</u>	<u>7,400</u>	<u>15,900</u>
Total	77,900	44,500	37,500	42,100	202,000

Justification for Unequal Apportionment

Personnel Compensation & Benefits:

Unequal apportionment due to attempt to cover part time summer help, pay increases and possible staff reduction.

Contracts:

Fish & Wildlife, Bureau of Outdoor Recreation and Computer Contracts and a portion of data processing contract to be awarded in 1st Quarter. Launch contract and remaining data processing contract to be awarded 2nd Quarter.

Other:

Dye studies to be carried out in 4th Quarter.

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**Personnel on Duty as of January 1, 1964
and
Personal Services Request for FY 1965**

Region and Location II, New York, N.Y. (DECS - Phila., Pa.) Program/Project No. Comprehensive/642
1964 Allotment No. 7540332 and Title Delaware Estuary Study

Position Title	Encumbent (as of 1/1/64)	Grade	Annual Rate	Year of Service 1965	1965 Request Compensation	Benefits	Remarks
<u>Authorized 1964 positions:</u>							
1- Project Director	E.L. MacLeman	SEDIR	\$11,955.76	22	10/64 \$11,340.00	\$2,719.76	
2- Deputy Technical Director	R.V. Thoman	SE	9,025.16	8	7/64 7,560.00 (SSE 7/64)	2,638.56	
3- Clerk-Stenographer	R. Lipman	GS-4	4,810.00		4,915.00	319.47	Effective 1/5/64 C.S. pay increase
4- Administrative Clerk	V. Tobin	GS-4	5,370.00		5,650.00	413.07	Position to be re- classified to GS-5 & pay increase
5- Plans & Projections Chief Planning Engineer	M.J. Sobel	SASE (R)	6,047.64	2	2/64 6,180.00 (SE 7/64)	2,489.16	
6- Evaluation Engineer	D. Marks	SASE (R)	5,747.04		3,912.48	1,976.56	
7- Engineer - Core & SCS Projects	D. Baker	SASE	6,047.64	2	6/64 5,280.00	2,309.16	
8- Engineer Operations	G. Pence	ASE (R)	4,928.08	1	7/64 3,912.48 (SASE 7/64)	2,005.56	
9- Engineer	A.W. Bromberg	SASE	8,375.16	4	7/64 6,240.00	2,309.16	

Personnel on duty as of January 1, 1964

Personal Services Request for FY 1965 - Continuation Sheet

Region and Location II - New York, N.Y. (DECS - Phila., Pa.) Program/Project No. Comprehensive/642
1964 Allotment No. 7540332 and Title Delaware Estuary Study

Position Title	Incumbent (as of 1/1/64)	Grade	Current Annual Rate	1965 Request Compensation	Benefits*	Remarks
10- Engineer	D Stoltenberg	SASE(R)	\$6,047.64	2 8/64 \$5,280.00	\$2,309.16	
11- Engineer	D. Wright	ASE	4,928.08	2 6/64 (SASE 1/64) 5,280.00	2,008.56	
12- Engineer	W. Blackard	ASE	4,928.08	2 4/64 (SASE 1/64) 5,280.00	2,008.56	
13- Engineer	W. Richardson	ASE	5,126.88	1 6/64 3,112.32	2,227.38	
14- Biologist	A. Morris	GS-11	8,045.00	8,410.00	660.92	Effective 1/5/64 U.S. pay increase
15- Chemist	B. DePrater	GS-9	7,800.00	8,180.00	618.82	" (Rar. Lab)
16- Chemist	R. W. Knight	AHS-6	5,126.88	1 7/64 3,112.32	2,227.38	
17- Lab Technician	D. D. Dow	GS-4	4,215.00	4,215.00	152.76	
18- Lab Technician	T. F. Toomey	GS-4	4,215.00	4,215.00	152.76	
Temporary Staff						
Physical Science Aid	W. Grossmuller	GS-3	3,880.00 (1/2 time)	1,940.00	70.32	
Summer	K. Wallach T. Sellar	GS-4 COSTEP		1,053.00 666.90	18.18 423.42	
				105,734.50	29,949.68	Tot. 135,684.18
						-5,000.00** 130,684.18

* Includes FICA contribution for Government.

** \$5,000.00 deducted in anticipation of possible transfer or separation of at least one officer.

WORKING BUDGET
Request for Funds, Fiscal Year 1966

Region and Location II - Phila., Pa. Program/Project No. Comprehensive/642
and Title Delaware Estuary Study

1966 Allotment No. _____ 1966
Request

1. Request

11 Personnel Compensation (Total) 87,000

Compensation other than con-
sultants

Consultants' fees

500

12 Personnel Benefits

26,000

21 Travel

Change of station including
dependents and dislocation
allowance

Car rental (all sources)

2,500

Other

3,500

22 Transportation of things

Change of station

500

Other

23 Rents, communications &
utilities (Do not include
space rental)

2,000

24 Other services

Contracts (Itemize)

21,000

Launch 1,000
Dept. of Agric. 2,000
Out. Rec. 13,000
Computer 2,000
CofE 3,000
21,000

Other

WORKING BUDGET
Request for Funds, Fiscal Year 1966 - Cont'd

Region and Location II - Phila., Pa. Program/Project No. Comprehensive/642
and Title Delaware Estuary Study

1966 Allotment No. _____	1966 <u>Request</u>
26 Supplies and materials	<u>2,006</u>
31 Equipment (Itemize and justify. Use separate sheet if necessary)	<u>900</u>

Total	<u>147,900</u>
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WORKING BUDGET
Request for Funds, Fiscal Year 1966 - Cont'd

Region and Location II - Phila., Pa. Program/Project No. Comprehensive/642
and Title Delaware Estuary Study

2. Requested Apportionment

	<u>1st</u> <u>Qtr.</u>	<u>2nd</u> <u>Qtr.</u>	<u>3rd</u> <u>Qtr.</u>	<u>4th</u> <u>Qtr.</u>	<u>Total</u>
Personnel compensation & Benefits	28,375	28,375	28,375	28,375	113,500
Travel	1,500	1,500	1,500	1,500	6,000
Contracts	21,000	-	-	-	21,000
Other	<u>1,900</u>	<u>2,400</u>	<u>1,600</u>	<u>1,500</u>	<u>7,400</u>
Total	52,775	32,275	31,475	31,375	147,900

Justification for Unequal Apportionment

Contracts - all contracts will probably be let in
in 1st Quarter.

Other - change of station (\$500) and equipment
charges (\$900) have been apportioned on
the best estimate possible.

DELAWARE ESTUARY COMPREHENSIVE STUDY

LONG RANGE ESTIMATES

1965	1966		1967*		1968+		1969+	
	Position	Amount	Position	Amount	Position	Amount	Position	Amount
17		\$252,000	14	\$185,000	10	\$104,000	2	\$60,000

* The intensive phase of the DECS is scheduled for completion during FY 1967.

* Estimates for FY 1968 and 1969 are for surveillance and possible expansion of Study to include entire basin of the Delaware River.

EXTERNAL EXPENDITURES
(thousands of dollars)

Project: Delaware Estuary Comprehensive Study
 FY : 1964
 Date : January, 1964

Amount	Method*	Recipient	Description of Work
1.5	Consult.	E. Mehr and D. O'Connor	See Page
24.5	C	Re-Entry Systems Dept. General Electric	Evaluation of alternative means of data computation.
6.4	C & P	Hueber Launch Service	Rental of boat for field studies.
1.0	P	Penn-Jersey Trans. Study	Retrieval of economic data of the Phila.-Trenton-Wilmington areas.
0.5	P	To be determined by bids	Preparation of punched cards for water quality data.
5.5	R	Bureau of Outdoor Recreation	Initiation of studies to determine recreational potential of study area and relationship with water quality.

* C - Contract
 R - Reimbursement to other Fed. Agency
 P - Purchase order
 O - Other, specify

EXTERNAL EXPENDITURES
(thousands of dollars)

Project: Delaware Estuary Comprehensive Study

FY : 1965

Date : January 1964

Amount	Method*	Recipient	Description of Work
10.0	C	New York University	Continuation of computer work on mathematical model of water quality, operations research problems and time series analyses.
5.0	C	Hueber Launch Service	Renewal of contract for boat services.
4.0	C	To be determined	For data processing, including preparation of punched cards, data retrieval, and processing of punched paper tape.
24.0	R	Bureau of Outdoor Recreation	Continuation of studies started in FY 1964.
2.5	R	Fish & Wildlife Service	Studies to determine fisheries potential of estuary and inter-relationship with water quality.

* C - Contract

R - Reimbursement to other Fed. Agency

P - Purchase order

O - Other, specify

DIVISION OF WATER SUPPLY AND POLLUTION CONTROL

Summary of Budget Changes FY 1965 & 1966

Project Delaware Estuary Comprehensive Study

Date Prepared January 6, 1964

1964 Estimated Working Budget A. "Built-in" changes

1. Decreases	Pos.	Amount
(a) Nonrecurring program costs (Does not apply - Project not phasing out)	-	-
(b) Nonrecurring equipment	-	40,400.00
(c) One less day of pay (262 days in 1964; 261 in 1965)	6 1/2	114.08
2. Increases		
(a) Annualization of 0 new positions authorized in 1964	-	-
(b) Increased pay costs:		
(1) Civilians	6 1/2	2,858.65
(2) Commissioned Officers	1	771.72
B. New Program Items	N/A	N/A

1965 Estimated Requirements

A. "Built-in" changes

1. Decreases	Pos.	Amount
2. Increases		
Consultants' fees	2	41,000.00
	18	13,700.00
	-	13,600.00
B. New Program Items	N/A	N/A

1966 Estimated Requirements (See Page 31)

1/ 5 civilians employed for part of period 7/1/63 thru 1/5/64 no longer on board.
4 civilians now employed were not employed for the entire period, however, figure given covers only the civilians now employed based on funds needed had they been on the payroll as of 7/1/63 thru 1/5/64.

As indicated on pages 18 and 19 there is an overall decrease in the estimated working budget for FY 1965; while personnel compensation and benefits and other items will increase \$27,300, reductions due mainly to supplies and equipment purchase amount to \$41,700. The working budget estimate of \$202,000 does not provide funds for STORET or public relations work outside the project. These items plus increased contract costs are already causing problems with our 1964 budget. Three contracts: General Electric, Data Loggers and stormwater overflow equipment ran over estimates by \$4,500, \$2,700 and \$1,100.

Increases in compensation and benefits are not due to added personnel, but reflect promotions and pay raises. However, it is now necessary that our permanent positions be increased by one to nineteen. This has become necessary since our temporary 1/2 time (20 hrs/wk) Laboratory Technician at Raritan Laboratory is considered as a permanent position.

BUDGET BY ACTIVITIES
(thousands of dollars)

Project: Delaware Estuary Study
FY : 1964 and 1965
Date : January 1, 1964

Activity	FY 1964	FY 1965
Headquarters and administration: Rent, office and lab.	36,300 -	39,100 -
Social sciences:		
Projections	6,000	7,600
Benefit analysis	5,500	26,500
Optimum Program analysis	7,000	9,900
Physical sciences:		
Inventory	-	-
Field instrumentation	35,100	-
Measurements and sampling	46,000	53,700
Laboratory equipment	5,600	2,900
Laboratory services	26,600	19,300
Machine data processing	10,200	14,000
Data analysis and evaluation	17,000	19,300
Reports:		
Preparation	6,000	7,700
Printing	600	3,000
Other(specify):		
General Electric Contract	24,500	-
	216,400	202,000

SPACE

33.

Project: Delaware Estuary Comprehensive Study
FY : 1964
Date : January 1, 1964

Location	Use	Area (sq. ft.)	Cost
321 Chestnut Street Philadelphia, Pa.	Office and Laboratory	2,200 500 2,700	(\$3/sq. ft. \$8,100/yr.
Fort Mifflin	Storage	24 x 24	
	Storage and Laboratory	25 x 15	\$0.00

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ATTACHMENT 1

DELAWARE ESTUARY COMPREHENSIVE STUDY

COMMITTEE STRUCTURE

Policy Advisory Committee

Technical Advisory Committee

Water Use Advisory Committee

- Planners and Industrial Developers
- Municipal
- Industry
- General Public
- Recreation and Conservation
- Fish, Wildlife and Commercial Fisheries

1. Policy Advisory Committee

Membership

Agencies with the legal power to abate water pollution

- i. State Health Departments of Delaware,
New Jersey and Pennsylvania
- ii. Delaware River Basin Commission
- iii. U. S. Public Health Service

One member with an alternate - total
5 members and 5 alternates

Members of the Policy Advisory Committee are responsible for representing other state and federal agencies, especially those with related water resources programs. Personnel of the other agencies are invited by the members to attend meetings of the Policy Advisory Committee.

The following is a partial list of these agencies with sponsors:

Public Health Service
Department of the Army
Corps of Engineers
Department of Agriculture
Soil Conservation Service
Department of Interior
U. S. Geological Survey
Bureau of Outdoor Recreation
Fish and Wildlife Service

Delaware River Basin Commission
Delaware River Master
New York City

Pennsylvania

Department of Forests and Waters

City of Philadelphia

New Jersey

Department of Conservation and Economic
Development

Functions

- A. Assure full coordination of effort and understanding
- B. Coordinate and assist in the inclusion of established water pollution control plans in overall comprehensive Water Quality Plan
- C. Advise the P.H.S. relative to the present DECS and future studies involving water pollution control in the basin.

2. Technical Advisory Committee

Membership

- I Agencies participating in work of study
- II Personnel familiar with technical aspects of water quality control
 - i. State Health Departments of Delaware, Pennsylvania and New Jersey
 - ii. Delaware River Basin Commission
 - iii. U. S. Public Health Service
 - iv. City of Philadelphia

To be added

- Immediately
 - Industrial Representative
- Near Future
 - Recreational Representative

Functions

- A. Keep agency represented appraised of the status of the DECS - the agency has one of its personnel who has a complete understanding of the technical phase of the DECS.
- B. Provide technical assistance.
 - 1. assistance in organizing of various projects
 - 2. provide additional qualified personnel for special phases of study

3. review preliminary drafts of reports
4. advise Policy and Water Use Committee on technical matters.

3. Water Use Advisory Committee

Membership

Six members and six alternates represent the following six sub-committees

- i. Fish, Wildlife and Commercial Fisheries
- ii. Recreation and Conservation
- iii. General Public
- iv. Industry
- v. Municipal
- vi. Planners and Industrial Developers

Functions

- A. Indicate to the Policy Advisory Committee the needs and desires of the people of the basin relative to water use with water quality as a criterion
- B. Act as a public relations group
- C. Assist in special non-technical phases of the DECS.

The entire Committee's first meeting is scheduled for the summer of 1964. Prior to this meeting several of the sub-committees are scheduled to meet during the spring of 1964.